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EDITORIAL DEPARTMENT NOTE

The brewing industry today is vastly different from what it was before the enactment of prohibition. Trade practices within the industry, together with strict governmental supervision, are bringing about a more efficient executive control, mainly through the use of better accounting and statistical records. Most of the literature on brewery accounting was published before the recent legalization of the manufacture of beer. The old accounting systems used by the pre-prohibition brewers are being supplanted in many cases by modern methods and equipment. It seems quite likely that standard cost accounting principles may eventually be adopted rather widely in the brewing industry, although at the present time perhaps only a very few standard cost accounting systems have been installed in breweries.

In this issue of our Bulletin we are publishing two papers on standard cost accounting for breweries. It would seem that the installation and operation of a standard cost system in a brewery should not present any particular difficulties. The papers in this Bulletin explain how it may be done and what results should reasonably be expected.

Charles Weissinger, the author of the first paper, commenced work at the age of 14 as an assistant auditor with the world-famous Louis Gergdoll Brewing Co. He progressed in that company's employ for 20 years until he graduated from the Evening School of Accounts and Finance of the University of Pennsylvania, Class of 1907. On January 9, 1907, he was granted a certificate as Certified Public Accountant in the State of Pennsylvania and has since that time been in public practice as such. He is a member of the American Society of Certified Public Accountants, Philadelphia Chapter of the Pennsylvania Institute of Certified Public Accountants, American Institute of Accountants, and Philadelphia Chapter of the N. A. C. A.

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PREDETERMINED COSTS IN THE BREWING INDUSTRY

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Philadelphia, Pa.

THE experiences which men had in the brewing industry before the advent of the Eighteenth Amendment are worthless today as a means of measuring present costs and profits. The conditions and habits of the people have changed completely and price levels without exception have been disturbed. Therefore, the legalization of the manufacture and sale of beer presents an entirely new problem for which reliable figures must be obtained for efficient managers and for interested investors.

It would be well for the country in general to have the capital, or at least a substantial part of it, supplied to this industry by the public, as in the case in public utilities. It would have a salutary effect upon the whole nation and prevent the thoughtless men who may engage in it from unethically bringing reproach upon all.

Since the passage of the Eighteenth Amendment, all of the breweries that continued to operate and make a legal beer (less than ½ of 1%), called near beer, have been working under disadvantages. The most potent factor in this regard was that in competition with the home brewers and with the stronger liquor supplied by bootleggers, the consumption of near beer decreased. For a short period of time after 1920, the near beer brewers were making money and when others observed this, the number entering into the industry increased and, with consumption falling off, all of them had to either give up or continue at a loss. Instead of succeeding in overcoming their difficulties, they kept on increasing in number so rapidly that, instead of a profit, financial loss was year after year the result. If the capital lost in the last 12 years could have been conserved, the cost of interesting new capital now would have been avoided.

Those who remained in the near beer business, even at a loss, have now a great advantage over those who gave up entirely because they have a going concern whereas those who quit have an

antiquated and corroded plant which is, in some cases, partly or wholly dismantled. For these latter, the cost of obtaining new capital in this period of depression is almost prohibitive. Since beer requires ageing, those who are prepared to supply the demand instantly have a great advantage over those who are coming along later, because the necessary ageing increases the amount of capital required and therefore adds to the cost of obtaining it.

It is generally conceded that the legalization of the manufacture and sale of beer came into being again because of a popular demand made by a very decided majority of the population. Of itself alone, it will not stabilize trade, but it will be a potent factor in that direction. Therefore, it will help to make us all happier, in more ways than one, and it will add to the prosperity of the nation and help to wipe out the deficit of the states and nation.

The wets claim that it will truly promote temperance and, in a general way, the change is being very favorably received. This auspicious condition will be reflected in the cost of production, selling, delivery and administration. For example, if the business were unpopular, there would be resistances on all sides to overcome, which would involve added expense. Now that the industry is in the good graces of the majority of the nation, the tax which will be levied will be cheerfully paid and other costs will be found to be easier to meet.

During the period from 1920 to the early part of 1933, the cereal beverages which were legally produced found their outlet in the sales to domestic railroad diners, restaurants, clubs, wholesalers, hotels, chain and other stores and home consumers, and only to a degree to distant distributors as, for instance, below the Rio Grande. There were, of late years, no good markets in Canada, because there they took earlier remedial measures to overcome the iniquities of prohibition. In more distant countries, our product was not welcome because there they had a beer of higher alcoholic content which had a much stronger appeal. Thus the markets were restricted so that volume could not be increased sufficiently to lower costs.

The legalized beer of higher alcoholic content will have much the same avenues of distribution, except that there will be many more of the same kind and that each will handle larger quantities. This will be so because the demand will be greater and the "home

brewers" who brewed their own will be, in course of time, fully eliminated. Then volume can be raised and costs brought down.

Schedule A gives the more important assets, current, movable and fixed. In addition to reflecting the assets carried in each plant in this industry, it has been so arranged that it, to a degree, suggests the processes that the beverage goes through before it reaches the consumer.

Schedule A, to a smaller degree, also indicates some of the other businesses which will be favorably affected by the legalization of the manufacturing and selling of beer. For example, the grain and hop growers, coopers, bottle and box manufacturers, automotive trade and many others.

Schedule A—Assets

Current
- Cash
- Malt
- Hops
- Cereals
- Fuel
- Supplies
- Accounts receivable
- Notes receivable

Movables
- Kegs
- Bottles
- Boxes
- Auto trucks
- Automobiles

Fixed
- Office
- Brew house
- Grain elevator
- Malt mill
- Boiler house
- Engine house
- Ice plant
- Fermenting house

Cold storage warehouse
De-alcoholizing house
Wash house
Filtering, carbonating and racking house
Garages
Bottlery
Machinery

The costs which are given on Schedules B and C, it will be understood, do not apply in all cases. To illustrate, a plant located in the grain belt can save on transportation charges. Then those plants which are located in the Middle West whose output is nation-wide can make as high as 18 brews per week, whereas in the East most plants will make only one brew in a day which means that equipment must be thoroughly cleansed each time to have it sterile when the next day's brew is begun. In other words, the efficiency of the average eastern plant as compared with the mammoth plants in the Middle West, is about one-third. This saving in western plants, added to that on transportation, lowers the cost per unit considerably. It is not intended to convey the idea that plants in the Middle West are not clean; they are, decidedly so. There could be no better way than to begin the second brew immediately after the first one is released and the third immediately after the second. The entire machinery and mash tuns are absolutely clean and sanitary.

There are other advantages in costs which some enjoy and others do not. For example, the large shippers find their costs lowered by being, first, on good highways over which their auto trucks can travel up to 100 hundred miles in one day, and second, on railroads and water fronts to receive materials from and ship their product to distant points. The reduction in this phase of the transportation costs also applies to grains that are used for cattle feed. The grains are a by-product of the malt.

No two concerns put out the same kind of beer so far as taste is concerned, even though in all other respects it might be prepared by exactly the same processes and almost the same quantities of materials. There is what is known as a sweet beverage in which the hop content is small and then there is the bitter beer where the hop content is greater. There are varying degrees in

between these two extremes. Drinking beer is an acquired taste. This means that many people have acquired the taste for a nationally advertised beer without knowing or caring anything about a less popular brand. To popularize a particular beverage costs considerable sums of money for advertising and other sales efforts. These, in mammoth concerns, cost millions of dollars. Therefore, there is a very decided, valuable, intangible asset which has been kept alive, in some cases, in the period from 1920 to the early part of 1933. The selling costs, which are given here, include a charge for its maintenance, continuance, increase and perpetuation.

Proper managers and experienced personnel are highly essential in a plant of the kind under discussion. They are its most valuable asset. Without them, costs cannot be kept down enough to produce satisfactory profits.

Another fact to be taken into consideration is the interdependence of the brewer, wholesaler and retailer. It is not an easy matter to convey to the reader how far-reaching this is, but in order to give some idea, one instance may be cited. Before the advent of the Eighteenth Amendment and the Volstead Law, it was customary for brewers to advance money to their distributors and to retailers with which to do business, pay taxes and the like. These loans were made chiefly on the character of the individual, as he had, in most cases, nothing else to offer. The customer paid when he could. He did not try to evade payment. In localities where this was the practice, there are still hundreds of thousands of dollars due the brewers by their customers who were put out of business by the adverse legislation. Some of these debtors have passed into the Beyond, but many of those that are still living and able to get back into the business will repay the debts that they contracted before 1920. If losses are sustained, they will be forced upon both brewers and customers by conditions and not because of any lack of integrity on the part of the debtor. Whether practices like this will continue to apply, depends upon Congressional legislation. Nevertheless, the interdependence cannot be overlooked or disregarded.

In a brewery that dispenses its products in kegs and bottles, there are many departments, as can readily be gleaned from Schedule A, but for the purposes of this article, the plant is divided into only two, the brewery and the bottlery.

The costs and expected earnings of the two units in the industry, subject to the variations hereinbefore named, are reflected, as to the brewery, in Schedule B. The total cost is extremely high today as compared with the total cost before the adverse legislation of twelve years ago, but this is due to the federal and state taxes which at this time are so necessary for the relief of those in want, because of no fault of their own, but because of the period of depression through which we are compelled to pass.

Schedule B—Brewery

Predetermined Costs of Manufacturing, Trading and Profit and Loss Per Unit of One Barrel of 31 Gallons.

Materials used	$1.60
Salaries and wages	.65
Fuel, water and supplies	.33
Maintenance	.36
Taxes, insurance and licenses (excluding new taxes)	.25
Cost of production	$3.19
Selling and delivery expenses	1.47
General expenses	1.07
Cost of selling and delivery	$2.54
Depreciation (purposely excluded from production because volume cannot be determined until later)	.43
Federal and State tax	6.00
	6.43
Total cost	12.16
Selling price	14.00
Profit	$1.84

The costs and expected earnings given above are stated in dollars and cents. It is customary to carry them out to four decimal places.

The costs and expected earnings of the bottlery are shown in Schedule C. The comments, in a general way, apply to the bottlery as they did to the brewery.

Schedule C—Bottlery

Predetermined Costs of Bottling, Trading and Profit and Loss Per Unit of One Case of 24 Bottles

Cost of beer received from brewery	$ .25
Bottling expense	.29
Cost of production	$ .54
Selling and delivery expense	.07
General expense	.09
Cost of selling and delivery	$ .16
Depreciation (purposely excluded from production because volume cannot be determined until later)	.05
Federal and State tax	.47
	$ .52
Total cost	1.22
Selling price	1.90
Profit	$ .68

The costs and expected earnings given above are stated in dollars and cents. It is customary to carry them out to four decimal places.

The costs and expected profits which are given are based on existing conditions. As more men get into the industry and as the competition therefore grows keener and the business becomes more stabilized, the selling prices will be reduced. The profits will then be considerably curtailed, so much so that only those plants which are efficiently managed will be able to make a profit at all. This however is not unusual. In a general way, it applies to all

industries. Obtaining additional capital in this era is a task for all businesses. It will be so for those who have remained in the brewing business through the prohibition period and it will be exceptionally difficult for those plants that have deteriorated from want of use. Those which have no going business at the present time will experience the greater difficulty in interesting capital to take mortgage bonds or to buy capital stock. Equipment notes given for the movable equipment will give some relief, but will not, of themselves, be sufficient. The cost of obtaining capital and the financing charges on the equipment notes are not included in Schedules B and C.

EXAMPLES OF THE TECHNIQUE USED IN PREDETERMINING COSTS IN THE BREWING INDUSTRY

The purpose of this section is not to give actual figures but to illustrate the methods pursued in predetermining costs for breweries as set down in the previous Schedules B and C. Factors which need to be taken into consideration are proximity to the market for raw material, and the quality and the volume of beer produced. In this hectic market, prices of material, supplies and labor have been constantly rising, therefore, any cost must be revised almost daily.

Materials Used

No two breweries have exactly the same formula. Therefore, it is necessary to work with the exact quantities and qualities prescribed in each particular case. These quantities, multiplied by the prices of the grades used give the total cost for materials in a barrel of beer. The cost multiplied by the expected volume will, of course, give the total cost. The following schedule will illustrate the determination of the cost of materials used in an actual case, except that the figures were changed and reduced to dollars and cents instead of carrying each item out to a four or six-place decimal as is done in actual practice.

	Quantity Used per barrel	*Cost of Material per unit*	*Cost per barrel*
Malt	1 bu.	$ .87	$ .87
Hops			
Domestic	1 lb.	.40	.40
Imported	¼ lb.	1.10	.28
Carbonic gas	¾ lb.	.07	.05
			$1.60

Salaries and Wages

Assuming that the total salaries to be paid to the executives is $17,000 a year, we will apply 15% or $2,550 to the brewery. In the case from which this work was prepared, the plant could sell double its capacity. Since its capacity is 75,000 barrels, it follows that they can operate to full capacity. Therefore, the rate on a full capacity will give the cost of $.03 per barrel.

About 13 brewery workers will be needed to produce 75,000 barrels of beer. One of these will be the brewmaster who will get a salary of $6,000 per year. The 12 other men will receive an average wage per week of $40 or $2,080 a year each. This will make the total brewery wages $30,960. Dividing this sum by 75,000, the cost per barrel is $.41, on the net production. By net production is meant the quantity produced net, after taking out the wastes which run anywhere from 0 to 15%, depending on whether open or sealed machinery is used and upon other factors.

The costs of wages for engineer and firemen in this case are where the brewery uses oil as a fuel. If coal is used, a different result would obtain.

To illustrate in schedule form more definitely what is meant by the preceding paragraphs:

	Amount	*Divided by*	*Cost per barrel*
Superintendence	$2,550.00	75,000	$ .03
Brewery			
1 brewmaster	$6,000.00	75,000	$ .08
12 brewers at an average wage of $40 per week	24,960.00	75,000	.33
Total brewery wages	$30,960.00	75,000	$ .41
Engineers and firemen			
1 chief engineer at a salary of	$5,000.00	75,000	$ .07
5 firemen at an average wage of $40 per week	10,400.00	75,000	.14
Total wages of engineers and firemen	$15,400.00	75,000	$ .21
Total salaries and wages	$48,910.00	75,000	$ .65

Fuel, water and supplies

The brewery under consideration would use 300,000 gallons of oil to produce 75,000 barrels of beer. This should cost not in excess of 6¢ per gallon. In the oil regions, of course, the price would be considerably less and, depending on the kind of equipment, might be as low as 2¢ per gallon. For our purposes, we are taking the price as 6¢ per gallon, which obtained in this particular case.

For the production of 75,000 barrels and for cleansing purposes, $1,500 would be the charge for water supply. This price would, of course, vary in case of municipal or artesian wells.

Based upon the studies made, engine room supplies cost 7¢ per barrel which, multiplied by 75,000 barrels, would give a cost of approximately $5,000.

	Amount	Divided by	Cost per barrel
Fuel	$18,000.00	75,000	$ .24
Water	1,500.00	75,000	.02
Enginer room supplies	5,000.00	75,000	.07
Total fuel, water and supplies	$24,500.00	75,000	$ .33

Maintenance

This item can be definitely determined from recent experience in those breweries which have been producing and marketing near beer and it will not vary with beer of higher alcoholic content. In the cases, however, where the brewery has been closed for twelve years, a very different situation presents itself. An expenditure for rehabilitating the plant will amount to, in some cases, 10% of the value of the entire plant. It would be justifiable to amortize this large expenditure rather than to charge it off immediately.

In a plant similar in size and nearly in the same location as the brewery we have been using as an example, but with a greatly reduced output of near beer, there was a cost of $9,000 for repairs of buildings and $18,000 for repairs of machinery. The plant in question will have no greater repairs with a maximum output, subject, however, to the extraordinary rehabilitation referred to above. Therefore, it was determined for the purposes of this article that 75,000 barrels would cost as follows:

	Amount	Divided by	Cost per barrel
Repairs to buildings	$9,000.00	75,000	$ .12
Repairs to brewery machinery	18,000.00	75,000	.24
Total maintenance	$27,000.00	75,000	$ .36

Taxes, insurance and licenses (excluding the new federal and state taxes)

The amounts of the taxes and insurance can be determined exactly. They will not vary in proportion to the increased output. Then, there are licenses and special taxes applying to wholesalers and retailers which became effective after the legalization of beer. The outline annexed sets forth these items as they appeared in our work.

	Amount	*Divided by*	*Cost per barrel*
Taxes	$12,500.00	75,000	$ .17
Insurance	4,500.00	75,000	.06
Licenses and special taxes (for details, see below)	1,570.00	75,000	.02
Total taxes, insurance and licenses	$18,570.00	75,000	.25

Federal brewery tax	$1,000.00
Federal special tax on wholesalers	50.00
Federal special tax on retailers	20.00
Miscellaneous state and municipal licenses	500.00
Total licenses and special taxes	$1,570.00

Cost of Production

The preceding material briefly outlines the method of predetermining the cost of production. We will now pass on to a consideration of the expenses.

Selling and delivery expenses—Brewery

These expenses can be determined in dollars and cents and some have to be divided between the brewery and the bottlery. In the case over which this explanation is molded, the brewery will have an output in barrels of 45,000 and the bottlery will put out the remaining 30,000 in the form of 390,000 cases. At the present

time, only the brewery expenses are being considered. The costs of the various items listed in the schedule below are determined in dollars and cents, 3/5 of the costs being applied to the keg department and 2/5 to the bottlery department.

	Amount	*Divided by*	*Cost per barrel*
Sales salaries and expenses	$15,000.00	45,000	$ .33
Motor truck maintenance, fuel and lubricants	6,300.00	45,000	.14
Motor truck insurance	2,220.00	45,000	.05
Garage supplies and expenses	450.00	45,000	.01
Taxes—garage	285.60	45,000	.01
Wages—drivers	12,012.00	45,000	.27
Freight and storage	450.00	45,000	.01
Wages—garage	3,276.00	45,000	.07
Motor truck licenses	780.00	45,000	.02
Kegs consumed	25,200.00	45,000	.56
Total selling and delivery expense—brewery	$65,973.60	45,000	$1.47

The reader will probably be interested in knowing how the amount is determined in each case. About 10 salesmen would be needed to market all of the 75,000 barrels of beer. The average salary of a salesman in the territory under consideration would be $2,000 and $500 would be allowed for expenses. Ten times this average salary would determine the amount of $25,000 of which $15,000 would be allocated to the brewery and $10,000 to the bottlery.

The cost of motor truck maintenance, fuel and lubricants runs, in this territory, $.14 per barrel, of which 3/5 will be applied to the brewery and 2/5 to the bottlery, because the trucks carry keg beer and bottled beer. In some cases, on a given delivery, they may carry all bottled beer, and in other cases, they may carry all keg beer, but the effort required to segregate these costs does not warrant pursuing a plan of obtaining them because, in tests that have been made, it has been found that they come so close to aver-

age costs that the small difference is not worth the effort put forth to obtain them. In plants where they have separate sets of drivers for each department, the wages paid them will be charged to the respective department which they serve.

Motor truck insurance, taxes and the like can be based on actual past performances.

The cost of kegs varies greatly with the kind of business done by the particular brewery. For example, a brewery which ships beer to distant points will probably get an average life of one year out of a barrel, whereas a brewery which does entirely a local business may get five or more years' life out of a barrel. These conditions are considered and, on the bases of present costs of kegs, the cost per barrel produced is determined and, in the case under consideration, the cost was calculated to be $.56 per barrel because the total cost was calculated at $25,200 which was divided by 45,000 barrels. It will be observed that the cost of kegs is wholly loaded on the brewery and none of it charged to the bottlery. All modern plants have tanks and pipe lines leading from the brewery to the bottlery which are under close federal supervision.

General expense—Brewery

These expenses are prorated on the same basis as some of the other expenses, namely, 3/5 for the brewery and 2/5 to the bottlery. In the following schedule, it will be observed that bad debts are very low. This is conservative because breweries at the present time are practically doing a cash business.

Advertising is an amount the limit of which is determined. Under present circumstances, however, very little of it is actually used because there is a much greater demand than the supply can meet.

Salaries of office employees and watchmen and general taxes can be definitely determined and unclassified expense is estimated on a basis of past experience.

	Amount	*Divided by*	*Cost per barrel*
Bad debts	450.00	45,000	$ .01
Advertising	30,000.00	45,000	.67
Salaries—office	7,260.00	45,000	.16
Wages—watchmen	936.00	45,000	.02
Taxes—general	480.00	45,000	.01
Unclassified expense	9,000.00	45,000	.20
Total general expenses—brewery	$48,126.00	45,000	$1.07

Depreciation—Brewery

The reader will undoubtedly agree that the depreciation on the brewery part of the plant is a production cost and can very properly be included in that section of the work, but it has been purposely excluded from production costs because volume and present-day values of plant cannot be definitely determined until later. To make it clearer, it is here treated as a separate item. All of the depreciation which applies to the production of beer should be put into that cost and should be reflected in the cost of beer transferred to the bottling department. Then, that depreciation which applies only to the bottling department would be stated as that department's depreciation in addition to that which is already contained in the costs at which the bottlery receives the goods. It is not contemplated by the brewery to make any profit on the bottling department. Whatever the cost for the respective month is, that is what is charged to the bottlery.

	Amount	*Divided by*	*Cost per barrel*
Brewery machinery and equipment..	$8,535.00	45,000	$ .19
Power plant and boiler house buildings	1,465.00	45,000	.03
Brewery buildings	4,531.00	45,000	.10
Cooperage	1,017.00	45,000	.02
Garage buildings	272.40	45,000	.01
Motor trucks	3,315.00	45,000	.07
Office and general buildings	357.00	45,000	.01
Total depreciation—brewery...	$19,492.40	45,000	$ .43

Federal and state taxes

The Federal Tax is $5 per barrel and the state usually levies a tax of about $1 per barrel, making a total of $6.

Cost of beer received by the bottlery from the brewery

The cost of production of a barrel of beer for the brewery is $3.19. A barrel will yield 13 cases plus some additional bottles which, eliminating the decimals, makes the price to the bottlery $.25 a case. As has already been stated, inasmuch as the entire output will be oversold, the maximum amount possible to produce is taken as the expected output.

Bottling Expense

The salaries paid the executives amount to $17,000 and 85% of their time will be required by the bottling department. Therefore, that amount is assigned to this item in the bottlery. Thirteen men will be needed in the bottlery for the production of 390,000 cases of beer. The superintendents will receive a salary of $75 a week and the 12 other bottlers will receive an average wage of $32 a week, making a total of $23,868.

In the instant case, experience has shown that there is a cost of $.12 for breakage and loss of bottles and boxes which, multiplied by 390,000 cases, gives $46,800.

The item of supplies and water rent is also determined on the basis of past experience and is similarly treated.

The costs of machinery repairs depends greatly on the condition of the bottling plant and the attention and maintenance provided for it. In this case, a provision was made after an inspection of the machinery and was based upon recent experience of near-beer brewers.

The actual cost of taxes and insurance can be determined and the amount divided by the output gives the cost per case. The following schedule sets forth the results obtained.

	Amount	*Divided by*	*Cost per case*
Prorata share of administrative and superintendents' salaries	$14,450.00	390,000	$ .0370
Wages bottlery	23,868.00	390,000	.0612
Bottles and boxes consumed	46,800.00	390,000	.1200
Bottling supplies and water rent	19,500.00	390,000	.0500
Machinery repairs	3,000.00	390,000	.0077
Taxes and insurance	4,085.00	390,000	.0105
Total bottling expense	$111,703.00	390,000	$ .2864

Selling and delivery expenses—Bottlery

The procedure in relation to selling and delivery expense has already been explained as it applies to the brewery. On these bases, we have the following resulting schedule for the bottlery.

	Amount	*Divided by*	*Cost per case*
Sales salaries and expense	$10,000.00	390,000	$ .0256
Motor truck maintenance, fuel & lubricants	4,200.00	390,000	.0108
Motor truck insurance	1,480.00	390,000	.0038
Garage supplies and expense	300.00	390,000	.0008
Taxes—garage	190.40	390,000	.0005
Wages—drivers	8,008.00	390,000	.0205
Wages—garage	2,184.00	390,000	.0056
Freight and storage	300.00	390,000	.0008
Motor truck licenses	520.00	390,000	.0013
Total selling and delivery expenses—bottlery	$27,182.40	390,000	$ .0697

General expense—Bottlery

The methods of predetermining the general expense have already been explained under General Expense—Brewery. We therefore have for this department the following results.

	Amount	*Divided by*	*Cost per case*
Bad debts	$2,262.00	390,000	$ .0058
Advertising	20,000.00	390,000	.0513
Salaries—office	4,840.00	390,000	.0124
Wages—watchmen	624.00	390,000	.0016
Taxes—general	320.00	390,000	.0008
Unclassified expense	6,000.00	390,000	.0154
Total general expense—bottlery	$34,046.00	390,000	$ .0873

Depreciation—Bottlery

As has already been explained under Depreciation for the Brewery, depreciation is a proper production charge and in actual work,

that is where the amount is placed, except such items as belong to the bottlery alone. In order not to hide it, however, in this treatment of the methods, it has been made a separate item. Inasmuch as the depreciation was not included in the cost of beer to the bottlery, it is set out separately at this point with the following results.

	Amount	*Divided by*	*Cost per. case*
Power plant and boiler house buildings, machinery and equipment..	$9,737.00	390,000	$ .0250
Bottlery machinery	3,587.00	390,000	.0092
Bottlery building	1,548.00	390,000	.0040
Cooperage	678.00	390,000	.0017
Garage building	181.60	390,000	.0005
Motor trucks	2,210.00	390,000	.0057
Office and general buildings.....	238.00	390,000	.0006
Total depreciation—bottlery..	$18,179.60	390,000	.0467

Federal and state taxes

The federal and state taxes which apply have already been explained under the brewery, and the bottlery, of course, must bear its prorata share.

Forty per cent of the total federal and state tax of $450,000, or $180,000, will be a bottlery expense, since 40% of the total sales were of case beer.

$450,000 x 40% divided by 390,000 cases equals $.47, tax per case.

Conclusion

In closing, it can be readily seen that the legalization of the manufacture and sale of beer presents a problem to brewery owners in properly determining the cost to them of operating their plants at a profit. The reader will probably agree that, with a reasonable degree of accuracy, the costs in a brewery can be predetermined. This can be done, notwithstanding that the figures which obtain in a near beer brewery cannot be applied, except in a

the breweries which remained in operation had no incentive to develop their accounting systems. However, great strides were made both in accounting theory and machine bookkeeping technique since 1919. As a result, there was probably not a single brewery in the United States operating under a system of standard costs at the beginning of the year 1933.

However there are now indications, still quite rare, of a standard cost installation here and there throughout the country. The larger breweries will take the lead because they will be the first to see the necessity and the best equipped for its ready application.

Before discussing brewery accounting it may be wise to have an understanding of brewery operations. Brewing is an ancient art, said to date from as early as 3000 B. C. There are many types of beer such as ale, porter, stout, bock beer and lager beer. The first three are produced largely in Great Britain and Canada and the latter two in continental Europe. We will restrict ourselves to the brewing of lager beer as it is made in this country. Most plants here make both light and dark beer, the color being dependent on the type of malt used.

Materials Used in a Brewery

The most important materials are water, malt and hops. Yeast is also required in the fermentation process. Beer consists of about 90% water; it is therefore important that the water used be of the highest quality.

Malt is usually purchased ready for use by the brewery. The manufacture of malt is a separate industry. Suffice it to say that malt is a barley grain in which germination has been caused to proceed to a certain stage and has then been arrested by the removal of water and the application of heat. It differs from the original raw grain in that the greater portion dissolves, for during this limited germination, enzymes are developed called diastase which attack the starch and convert it by hydrolysis into a mixture of soluble compounds in the process called mashing.

The unmalted grain substitutes or malt adjuncts most commonly used are rice with smaller quantities of unmalted barley, corn or oats. Hops are used for the production of the aroma and bitter flavor and because they contain various preservative qualities.

The Brewing Process

The lager process of brewing originated in Germany; the word "lager" meaning "to store," in German. In the classical German system of lager brewing, the beer is stored in lager cellars for many months. Every brewery is built in two sections; the brewhouse and the fermenting house. The general appearance of a lager brewhouse is distinctive with its copper vessels surmounted by domes and chimneys to carry off the steam.

It must be remembered that no two formulas for the manufacture of beer are the same, each brewmaster combining the ingredients in a different manner.

The brewing process usually begins in the brewhouse at the mash-tub and cooker. Just above them the prepared malt is crushed in order to make it accessible to hot water. The crushed malt, or grist as it is now called, runs into the mash-tub which was first filled with hot water. About one-fourth of the grist in like manner runs into the cooker, which is immediately adjacent to the mash-tub. Here are also added corn grits or rice and the whole contents are then slowly boiled. This boiling mixture is then pumped into the mash-tub raising the temperature of the mash and water mixture therein. The process may be repeated until the desired temperature is reached. A transformation takes place inside the tub through the action of a soluble ferment in the malt, the diastase mentioned above, which converts the starch in the malt into malt sugar. The whole process takes between two and three hours.

The mash then passes into a lauter-tub which retains the spent grains, the purpose being to preserve as many solids in the mash as possible. The mixture next passes through a sparging process which distributes a gentle and continuous shower of hot water equally over the surface of the mash in order to wash ou the malt extract, called wort. This wash water is then drained off leaving behind the brewers' grains which later are sold for hog feed. Hops are added in quantity generally from ½ to 1½ pounds per barrel and the mixture is boiled for about two hours by means of steam coils for the purpose of evaporation.

On the way to the fermenting tuns the wort passes into the hop-jack or strainer, a vessel with a perforated false bottom

through which the wort drains leave the hops behind. The wort is cooled during the process of transfer to the fermenting house. Fermentation with the aid of yeast takes place in the fermenting house maintained at a low temperature by refrigerating machinery with direct expansion coils, using ammonia. The fermentation is usually begun at 41° to 50° F. rising some 5° above these temperatures during fermentation, which takes a period of from six to twelve days. The beer is cooled to 36° to 45° F. before transference to the lager casks in the ageing cellars. Lager casks are maintained at close to freezing temperature and the beer is stored there for a few months.

During the ageing process the beer develops a fine creamy condition and undergoes with clarification a distinct change in flavor and mellowness. After ageing it is ready for delivery either to the racking department (keg beer) or to the bottling department (bottled beer). Beer is received from the cellars either in tanks or by pipe line. In either case the federal stamp tax is payable at time of transfer. The production of beer terminates at the time it is transferred from the ageing cellars.

Most beers are surcharged with carbonic acid gas before kegging or bottling. Some of this gas was collected previously, during the process of fermentation.

Bottles, kegs and cases are generally purchased. The cooperage department however is kept busy repairing kegs which have been out in trade. The filling of bottles readily lends itself to mechanical contrivances, and automatic bottling units in which hundreds of bottles per hour can be dealt with, are quite common. The bottling plant of one of the larger western breweries is able to fill over 3,000 bottles per minute.

Brewery Accounting Before Prohibition

Brewing is one of those fortunate industries in which accurate costs can be obtained with moderate ease and without great expense. There are only about five or six materials entering into it and about an equal number of major operations. The product is constant in character, in process for a long period and the several brewings are often consolidated. Under a system of process costs it is a simple matter to keep the accounts of a brewery in

such a manner that the average cost per unit of each process or department can be determined.

So it is clear that accounting for manufacturing presents no great difficulties, but apparently accounting for sales and distribution before prohibition was not so easy. In a book* published in 1913, Frank W. Thornton classifies brewery accounts as follows:

1. Those for the manufacture of liquor.
2. Those for the sale and distribution of liquor.

In a note under the second division, he says "They are perhaps the most irregular and inexact accounts met in large enterprises."

Another authority, Charles A. Sweetland, in an article** written at about the same time, says "Owing to the large amount of detail, the various ramifications, and the peculiar conditions connected with the brewing business, the accounting is probably as intricate as in any business, and some authorities claim it is the most intricate of any."

There were a number of conditions that brought about this situation. The most important was the prosperous condition of the early American brewers which led customers to impose on them for loans, gifts and to seek their aid in all financial troubles. Such aid was freely given and the disposition to extort from brewers unreasonable gratuities, allowances and favors grew more and more. As a result the increase in running expenses, cost of materials and bad debts so reduced the margin of profit that it soon became essential to have correct accounts and monthly statements so that leaks might be stopped before serious losses were incurred.

The greatest difficulty was in keeping the customers' accounts accurate. Through loans, gifts, etc., the brewers obtained extensive interests in their customers' property. It was common for the brewery to pay for equipment in a new saloon and to provide money for licenses. In many cases the brewer owned the lease, or the property itself, and all the fixtures as well as the tables and chairs. Furthermore the proprietor was not permitted to pay off his loan but only to receive credits in a so-called discount out of

* Brewery Accounts, 1913, American Institute of Accountants.
** Encyclopedia of Commerce, Vol. 8, 1910.

purchases. Competition was keen among brewers and it was their aim to control as many customers as possible.

The method adopted was somewhat as follows: Each customer had a loan from the brewery, secured by a chattel mortgage. To all appearances this loan was paid off by the instalment plan, but saloon keepers in those days were far from being business men and the debt was generally paid in accordance with the wishes of the cashier at the brewery. Discounts ranged from 25 to 40% and were most flexible to suit the will of the brewer. Part of the discount was deducted from the price, as true discount should be, and the other part was used as a credit upon the saloonkeeper's loan. Therefore the proprietor was never allowed to pay off his loan in cash but only by discount credits thus assuring the brewery of his continued patronage. Furthermore he hardly ever knew how much credit was given by him on the loan at each sale or how much he really owed the brewery at any one time.

Thus we see on the books of those days, under the heading of Expense for Holding the Trade, such accounts as the following:

1. Repairs and improvements to saloons.
2. Repairs to iceboxes, pumps, bar fixtures, etc.
3. Donations and presents.
4. Money paid for charities, church fairs and hospitals.

And on the balance sheet there were such accounts as:

1. Loans to customers.
2. Leases on saloon properties.
3. Saloon furniture and fixtures.

It is not surprising therefore that Sweetland and Thornton were of the opinion that brewery accounting was intricate. It is hardly possible to conceive the difficulties which must have been encountered in keeping customers' accounts under these circumstances.

Brewery Accounting Under Modern Methods

There is little doubt however that the brewery accounting systems which are now being developed will bear little resemblance to those of 20 years ago. Furthermore, breweries throughout the country will be subject to Federal Regulation No. 9 of the Bureau

of Industrial Alcohol concerning the manufacture and tax payment of fermented liquor. Every state and every local government body will issue its own regulations for the sale of fermented liquors at wholesale or retail.

To cite only one instance of the important influence which these regulations will bear on the industry, consider this paragraph taken from the regulations issued by the New York State Alcoholic Beverage Control Board:

> "No brewer can be interested, directly or indirectly, in any premises where beer or wine is sold at retail, or in any business devoted wholly or partly to the sale of beer at retail by stock ownership, interlocking directors, mortgage or lien, or by any other means unless the interest was acquired on or before Dec. 31, 1932."

This will virtually do away with the control by the breweries (in New York State at least) of the retailer and will undoubtedly minimize the difficulties of keeping customers' accounts. Government regulations will without question play a big role in formulating the accounting systems which are being adopted by breweries.

The principal books of account are similar to those of almost any other manufacturing business. In addition to the accounting records, the government prescribes certain reports and records in Section 22 of Federal Regulations No. 9 which reads as follows:

> "Each brewer will keep a daily record and summary on Form 103 (See Figure 1) of each month's transactions; the entries on such daily record must be made during the day on which the transactions occur, all entries to be completed not later than the close of business each day. Monthly returns of the operations of such plants on Form 103 will be made not later than the fifth day of each month for the preceding month. Such returns shall be made in triplicate, each copy duly sworn to or affirmed, one copy thereof being forwarded to the Supervisor of Permits, one copy filed with the Commissioner of Industrial Alcohol, and one copy retained by the permittee and filed as a permanent record, so as to be available for inspection at any time.
>
> "Each brewer must keep at the brewery, and available for inspection at all times, a daily sales record showing in detail the number and kind of packages, such as hogsheads, barrels, half-barrels, cases, etc., sold or removed, the names and addresses of the purchaser, and the amounts sold to each such purchaser."

Before discussing the accounting records a few words of explanation are necessary. In pre-prohibition years, the sales for the months of June, July, August and September comprised about 50% of the sales for the whole year. Monthly profit and loss statements are desirable, especially at the present time as a basis

for future production. The accounts of most breweries are audited quarterly, the fiscal year ending September 30. Breweries have in the past operated under a system of process costs, but standard or predetermined costs are fast becoming necessary.

Statements and Accounts

Following are a few typical statements of a brewery which, for convenience, we shall call the Empire State Brewery. They are as follows:

A. Consolidated Statement of Assets and Liabilities as of 9/30/33.

B. Statement of Profit and Loss, Keg Department, for month ending 9/30/33.

C. Statement of Cost of Production, Keg Department, for month ending 9/30/33.

D. Schedule of Overhead Expense, Keg Department, for month ending 9/30/33.

E. Statement of Cost of Production, Bottled Beer Department for month ending 9/30/33.

Statement A is a consolidated statement of assets and liabilities for both the Keg Department and the Bottling Department. Statements similar to these are prepared for both departments and may, if desired, also be consolidated.

As was mentioned above, the production of beer ends when the beer is transferred from the cellars either to the racking room or the bottling department. At this point the cost of production is divided between the Keg Department and the Bottling Department. The latter department should always be charged by the brewery with the cost of beer to that point of production and through a proper set of separate accounts, it should bear its own specific expenses, and those which cannot be easily divided can be prorated on the basis of sales or by some other method.

Statement A

Consolidated Statement of Assets and Liabilities of The Empire State Brewery as of September 30, 1933

ASSETS

Current Assets:
- Cash
- Accounts and Notes Receivable—Keg Beer
- Accounts and Notes Receivable—Bottled Beer
- Inventories:
  - Raw Materials (Standard Cost)
  - Finished Product (Standard Cost)
  - Less Reserve*
- Sundry Deposits, etc.
- Total Current

Investments

Fixed Assets:
- Land and Buildings
- Machinery and Equipment
- New and Old Containers (at plant)
- Transient Containers**
- Delivery Equipment
- Furniture and Fixtures
- Total Fixed

U. S. Government Stamps

Total Assets

LIABILITIES

Current Liabilities:
- Accounts Payable
- Notes Outstanding
- Sundry Creditors
- Total Current

Customers' Deposits on Containers**

Capital Stock

Surplus

Total

* This reserve brings the value of inventories down to cost or market whichever is lower.

** These two accounts should always offset each other.

Statement B

Statement of Profit and Loss—Keg Department of the Empire State Brewery for month ending 9/30/33

Net Sales

Less, Cost of Product Sold:
Inventory of Finished Product, 8/30/33*
Add Cost of Production* (See Statement below)
Total

Less, Inventory of Finished Product, 9/30/33*

Less, Allowance for Waste and Shrinkage
Balance
Total Cost of Product Sold*
Gross Profit on Sales*

Less, net variation from standard cost:
Materials, gain
Labor, loss
Overhead, loss
Net Variation Deducted
Actual Gross Profit on Sales

Deduct Selling Expense:
Cost of Revenue Stamps
Delivery Expense
Collection Expense
Advertising
Miscellaneous
Actual Net Profit on Sales
Deduct Administration Expense

Deduct Financial Expense
Actual Net Profit for Keg Department

* Items valued at standard cost.

Statement C

Statement of Cost of Production—Keg Department—of the Empire State Brewery for month ending 9/30/33 (at standard cost)

Raw Materials Used:
Inventory, 8/30/33
Purchases, net
Total
Less, inventory 9/30/33
Balance
Less, brewers' grains sold
Cost of Materials Used

Direct Labor

Overhead Expense (See Schedule D)
Cost of Production at standard cost

Schedule D

Overhead Expenses—Keg Department—of the Empire State Brewery for month ending 9/30/33 (at standard cost)

Brewmasters Salary %
Indirect Labor %
Steam, Light and Power %
Supplies Used
Depreciation %
  Buildings
  Machinery
  Cooperage (Stationary vats, etc.)
Repairs %
  Buildings
  Machinery
  Cooperage
Maintenance %
Laboratory and Yeast Room Expense %
Rent %
Insurance %
General Office Expense %

Statement E

Statement of Cost of Production—Bottled Beer Department—of the Empire State Brewery for month ending 9/30/33 (at standard cost)

Raw Materials Used:
  Cost of Beer from Keg Department
  Crowns, labels, etc.
  Cartons and bottling sundries
Direct labor
Overhead Expense
  Cost of Production at standard cost

The inventories are valued at standard cost throughout the year, but if at the end of the fiscal year this valuation is higher than cost or market, conservative practice requires that a reserve be set up. The statement of profit and loss shows the inventory of finished profit, cost of goods sold and the gross profit on sales at standard cost. To this amount is added or subtracted the net variation from standard cost to give the actual gross profit on sales.

It will be observed on the cost of production statement of the Keg Department that there is no item of inventory of liquor-in-process. This is one instance where the accounting system has

been set up to agree with the federal regulations as will be explained later.

The cost of selling and of administration statements differ very little from those of other businesses.

Standard Costs in Relation to Breweries

The reader at this point should have a fair idea of the type of accounts which are to be found in a modern brewery. The simplicity of the manufacturing process makes it possible to use a very simple cost system.

The materials are few and the departments may be divided into four classifications:

1. Brew-house
2. Cellars
3. Racking department
4. Bottling department

As was pointed out in the description of the production of beer, the greater part of the labor in connection with brewing is expended in the first two or three days. From then on, the liquor is either at rest in the fermenting house or in the ageing cellars.

When standard costs are applied to a business as simple as brewing, their application need not in any way make the cost accounting more complicated than it was under an actual cost system.

Every manufacturing business uses a cost system with a definite purpose in mind, viz., to control operations in an efficient manner. For many years actual costs have served breweries well in achieveing this goal and without doubt they will continue to do so. But in the final judgment, the choice of a cost accounting system must depend on the following considerations:

1. Is it applicable to the particular business?
2. Will it prove the most efficient?
3. Will it save expense in the final showing?

It is impossible to answer these questions conclusively as the application of the new system is only in the experimental stage. But there are a few of the larger producers who are willing to gamble and who have undertaken to install the standard cost system.

Where an industry has been using one system of cost accounting for over three-quarters of a century, it is not easy to change. However, the standard cost system in the opinion of some of the foremost accountants in the country is the best yet devised to meet the modern requirements of manufacturing business.

One of the difficulties which will be met in the brewing industry is in educating the foremen of the various departments in a brewery as to the great benefits which may be derived by the use of standard costs. Under actual costs a department foreman may be able to compare his costs with those of the previous month, the previous six months' period or the previous year. However, he has not the definite and accurate knowledge of his department that a comparison with standards would afford him. Unless foremen and other department heads are sold on the advantages which standard costs give, it will be a hard task to apply the system as it is supposed to be applied.

In regard to the comparative expenses of operating under the two systems, it should be pointed out that the installation expense for standard costs is somewhat higher than that for actual costs but where an actual cost system has been in use for some time, the cost is not large, especially for as simple a business as brewing. It has been the experience of many hundreds of other businesses of similar nature that the savings made possible by the careful control of operations which standard costs allow, more than outweigh this initial expense.

G. Charter Harrison in his book "Standard Costs" makes this statement: "Standard costs have been developed not to cost money, but to save money, not to be an expense but to aid in planning for and realizing profits in industrial operations. Business conditions, bringing increased keenness of competition and narrowness of profit margins, have intensified the necessity for the installation and use of standard cost systems and for the complete budgetary control which they give."

Actual Application of Standard Costs to a Brewery

In laying out the actual application it is advisable to avoid disturbing the present methods except where absolutely necessary. Inasmuch as the application of standard costs to brewery accounts is still in the experimental stage, it will be well to go into the

procedure with some thoroughness. Each of the three elements of cost of manufacture is taken up in the usual order. The journal entries in this section setting up variation accounts are merely to make clear the nature of the entry and would not appear, in the form shown, on the brewery books.

Raw Materials

Let us assume that the Empire State Brewery is about to begin operations for the new fiscal year and that it has made contracts for the purchase of raw materials. Delivery orders against these contracts are made with copies for:

1. Vendor
2. Accounting Department
3. Receiving Department
4. Stores Department
5. Superintendent's office for approval.

The receiving department makes a receiving memo in triplicate of the weight and quantity of each lot of material as follows:

1. Receiving Department (Reference only).

Copies 2 and 3 are delivered with the merchandise to the purchasing department for inspection and price checking. One of the copies is then passed to the accounting department, which authorizes the payment of invoices only after the material has passed inspection; the other copy goes with the merchandise to the stores department.

The general procedure at the accounting office upon receipt of this memo is as follows:

1. It is posted at standard cost to the material book which is a perpetual inventory record of the principal ingredients going into the manufacture of beer.
2. Upon receipt of the invoice from the superintendent's office, the standard cost is posted to the invoice and the difference computed.
3. The receiving memo is then attached to the purchase order and filed.
4. The actual, standard and variance costs on all invoices are now summarized on the daily invoice operating record.

5. It will now be neceessary to open variation accounts and the corresponding entry is:

Dr. Raw materials inventory (Standard cost)
Dr. Materials price variation account
Cr. Vendor account
Entry made upon receipt of materials.

The foreman or head-kettleman makes out the requisition which is approved by the superintendent. The stores department makes a record of the malt delivered, at standard cost, and delivers the material to the brewhouse.

The total of the day's requisitions are then sent to the accounting office where they are priced and extended at standard cost and posted to the material book. The journal entry for this would be as follows:

Dr. Liquor-in-process (Standard cost)
Cr. Raw materials inventory (Standard cost)
Entry made when material is requisitioned.

When a department needs more than the standard quantity of material, the foreman makes out an excess material requisition. These are posted at standard cost to the daily excess material report which, upon completion, is journalized as follows:

Dr. Liquor-in-process (Standard cost)
Dr. Material usage variation account
Cr. Materials inventory (Standard cost)
Entry made due to excess usage of materials, viz., more were required than the standard quantity.

By this means the superintendent knows at once if too much material is being used and excess material requisitions are available at any moment to show the reason.

Control of raw materials is especially important in a brewery. In the first place it is probably the highest element of cost that enters the manufacture of beer; secondly it was one of the chief elements of waste in pre-prohibition years and, finally, very unusual price fluctuations are encountered. When material costs go up it is well for the foremen to know whether it is due to a rise in prices or on account of waste in the use of materials and exactly how much of the variation is due to the first cause and

how much to the second. Standard costs will give him this information accurately and promptly so that he will be able to make adjustments immediately.

Direct Labor

There are only about four major productive operations as follows:

1. Brewing
2. Ageing
3. Racking
4. Bottling

Each of these may be sub-divided into many other operations such as grinding, mashing, boiling, filtering, surcharging and innumerable others. The extent of the detail will depend upon the wishes of the management. At installation a standard time is set up for each individual operation. Each operation usually requires the services of several men so that this standard time will have to be divided in some definite proportion among the men engaged in one activity. Time studies are necessary before the standard time and an equitable division among the workers can be set up.

Employees are generally paid on the hourly basis. The rate will of course have an occupational range depending on the activity assigned. When employees work on one operation only, a single clock card will suffice; when the time of employees is divided between operations, it will be necessary to provide daily time clock cards. Up to the present time many breweries have been working on three shifts daily. In ordinary times the weekly payroll is about the same the year round. The first step in the accounting office each morning is the posting, from the daily time card to the individual payroll sheet, of the actual number of hours worked, called clock hours. Idle time is posted to column 2 and the difference, the actual production hours, is shown in column 3.

The standard hours credit is then computed based on the basic standard rate and is set down in column 4. Column 4 divided by column 3 gives the time efficiency of the employee posted in column 5. Applying the employee's hourly rate first to his actual production hours and then to his standard hours credit, we obtain his actual production pay, the standard production pay and the

difference which is the labor variation. These are extended in columns 6, 7 and 8 respectively, each column being totalled at the end of the week and posted to a weekly Productive Labor Operating Report. The department totals are thus arrived at and by recapitulating all departments on a similar report sheet, the total production figures at standard and actual costs and the variations are summarized forming the basis for the journal entry:

Dr. Direct Labor
    Cr. Labor variation
    Cr. Accrued payroll

Burden

When the standard cost system was originally installed, a nucleus expense budget was set up distributing labor and burden at normal capacity in the ratio of 2 to 3, viz., burden was applied as 150% of direct labor. (Any other ratio could have been chosen to suit the conditions of each plant.) This ratio having been decided upon, it is then the aim of the management to keep overhead always at normal capacity or within the normal limit of 150% of direct labor.

However, the burden is made up of two parts: fixed burden and variable burden. Consequently if production goes below normal, burden expense will not follow in the same ratio, for some of it is fixed and remains stationary. Instead, it will vary with the percentage of normal production.

This fact has been taken into consideration in preparing the allowances for the various expense budgets. These budgets are submitted once a year by the foreman of each department. They are the estimates for the various degrees of normal for the coming year, by weeks. Management endeavors to adhere as closely as possible to the ratio, 2 to 3, which has been agreed upon originally.

The expense budget for the cellar department would be set up as follows:

	Fixed Allowance	*Variable Allowance*	*Estimated Degree*	*Normal Allow.*
Week of 10/1/33..	$2,404	$2,698.00	43%	$3,564.14
Week of 10/8.....	2,404	2,937.50	44	3,696.50
Week of 10/15....	2,404	3,077.50	43	3,758.20

In figuring the actual allowance for a particular week, we must know the percentage of normal under which the department actually worked. Our payroll was actually $932.15; our production labor for a normal week (based on nucleus budget) would be $2,111.71. Therefore $\frac{\$\ 932.15}{2,111.71} = 44.142\%$ of normal. The actual allowance for the week of 10/8/33 would be computed as follows:

Fixed Allowance	$2,404.00
Variable Allowance ($2,937.50 × 44.142%)	1,296.67
Total Overhead Allowance	$3,700.67

The actual overhead expense is obtained as follows. All requisitions, time cards and invoices charged to the various accounts are posted daily directly to the general ledger. At the close of the week the old balance is subtracted from the new balance to determine charges to the account and this is posted to the Detail Sheet for Weekly Overhead Analysis.

The total overhead allowance, computed above, is posted to the second column of the detail sheet and the difference, or overhead variation, is posted alongside. A column also appears for the cumulative total of these weekly variations showing at a glance the condition of the account since the beginning of the fiscal year. The corresponding journal entry would be as follows:

Dr. Total Overhead Allowance (Standard cost)
Dr. Overhead Variation (Under-absorbed overhead)
    Cr. Actual overhead expenditure
    Cr. Overhead variation (Over-absorbed overhead)

Thus, the variations which arose in actual operations have been carried to variation accounts apart from the inventory accounts of raw materials, liquor-in-process and finished product which are carried at standard. The closing book inventory accounts appear in the balance sheet at standard; the variation accounts are closed out to the profit and loss account monthly.

In order to show as simply as possible the variation factors, we might construct a table somewhat as follows:

	Materials	*Variations Due to Labor*	*Overhead*
1.	Price	Time Efficiency	Machine Effectiveness
2.	Use		Degree of normal capacity used
3.			Rate of spending

All of these variations may be elaborated if the management so desires. They are expressed as so much per cent of standard and act as a most dependable barometer, giving both the per cents and the actual amounts of each individual variation.

As soon as standard costs have been installed and are working in some of the larger breweries, producers will begin to recognize what a remarkable control they afford over every department in a brewery.

Modern Methods of Accounting for Sale of Beer

It was noted that there is no item of Liquor-in-Process on the Cost of Production Statement, yet raw materials used in a brewery are charged to this account at the time it is requisitioned. This apparent paradox is due to the government regulation which requires that all liquor-in-process must at the end of the month be taken up as fermented liquor (Finished product inventory) and afterwards accounted for as liquor to be stamped for sale. The purpose of this provision is to have the Revenue Stamp Record show, on the last day of each month, the total amount of liquor produced. (See Figure 1.)

This procedure causes a certain amount of partially manufactured liquor to be recorded and valued as finished liquor. But the error is small and is more than offset by a specific allowance for waste and shrinkage (about 5%) which is allowed by the government.

Another regulation which the government requires is a daily sales record "showing in detail the number and kinds of containers

TREASURY DEPARTMENT
BUREAU OF INTERNAL REVENUE

Permit No.

MONTHLY RECORD OF TRANSACTIONS AT BREWERY

(ACT OF MARCH 22, 1933)

(Name) (Number and street) (City or town and State)

In the permissive district, during the month of, 193

Day of Month	MATERIALS USED					FERMENTED LIQUOR							
	Malt	Hops	(Fill in for other extract and alcohol producing materials)			Produced	Per cent S. W.	Removed at Pipe Line to Bottling House	Per cent Alcohol by Weight	Per cent Gallons	Removed in Barrels and Kegs	Per cent Alcohol by Weight	Per cent Gallons
	(Pounds)	(Pounds)	(Pounds)	(Pounds)	(Pounds)	(Barrels)		(Barrels)			(Barrels)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Totals							xxx		xxx	xxx		xxx	xxx

SUMMARY

1. On hand first day of month,	
2. Produce (total of column 7),	
3.	
4. Totals,	
5. Removed by pipe line to bottling house (total column 9),	
6. Removed in barrels and kegs (total column 12),	
7.	
8. Loss and wastage,	
9. On hand last day of month,	
10. Totals,	

9—32888

FIGURE I

STATEMENT OF MATERIALS RECEIVED DURING MONTH

Kind (See cover)	FROM WHOM PURCHASED	CITY AND STATE	MALT (Pounds)	HOPS (Pounds)	(Fill in the other materials)			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. TOTAL,								
2. On hand first day of month,								
3.								
4. TOTALS,								
5. Used,								
6. Sold,								
7.								
8. On hand last day of month,								
9. TOTALS,								

STAMP ACCOUNT

	DENOMINATIONS										VALUE	
	$1's	$2's	$5's	$100's	$500's	M	M	M	M	M	TOTALS	
1. On hand first day of month,												
2. Bought during month,												
3. TOTALS,												
4. Used for pipe line,												
5. Used on packages,												
6.												
7. On hand last day of month,												
8. TOTALS,												

I am personally familiar with the statements made in this return and know them to be correct and true, and hereby swear (or affirm) that no fermented liquor was sold or removed illegally during the month. I further swear (or affirm) that the entries in the stamp account are true and complete and that all stamps used have been used in conformity with the law and regulations.

_____ [SEAL]
(Proprietor or officer of corporation)

Subscribed and sworn to before me this _____ day of _____, 193

_____
(This jurat must be executed before some officer authorized to administer oaths as specified in sec. 128 of reg. 3 which includes internal revenue gauger, district or deputy collector, prohibition agents, clerks of court, etc.)

INSTRUCTIONS

1. Return on this form will be made in triplicate. One copy will be forwarded to the supervisor of permits for the district, and one copy to the Commissioner of Industrial Alcohol, Washington, D.C., on or before the fifth day of the month following that for which rendered. One copy will be filed at the brewery as a permanent record, available for examination by Government officers.

2. Entries of fermented liquor produced and disposed of will be made in terms of barrels of 31 gallons. The amount of fermented liquor to be entered in columns 7 and 8 will be that produced in the settling tanks.

3. In the "Stamp Account" the entries of stamps "Used for Pipe Line" and "Used for Packages" must in the aggregate represent the tax on the whole quantity of liquor tax paid and as reported in the Fermented Liquor accounts as "Removed by pipe line to bottling house" and "Removed in barrels and kegs".

FIGURE I (Reverse Side)

sold or removed, the names and addresses of the purchasers, and the amounts sold to each such purchaser."

The amounts are kept both for the number of barrels sold and their value. The quantity sold shown by the sales record will be the same as appears on Form 103 as the amount transferred to the keg or bottling departments. This in turn ties up with the Daily Stamp Record, all of which forms an excellent check on the brewmasters operations and serves the purpose of the Internal Revenue Bureau as well.

Importance of Container Control

The expense of delivering beer and returning the containers is an important item in all plants, and should be subjected to the same careful analysis as manufacturing costs. Keeping an accurate record of containers and their values is absolutely necessary because, in many instances, the value of the containers is greater than that of the contents, especially for kegs and cases. In addition there is a very serious shortage problem in times like the present when the demand for beer is still heavy.

All records for the sale of keg beer and bottled beer are generally kept separately. This causes some slight duplication where customers deal in both kinds but it is the best method to follow.

Figure II illustrates the forms suggested by one of the large business machines companies. The statement to the customer is the original, the customer's ledger account is the first carbon copy and the proof journal the last.

This style of machine has a keyboard which permits entering several classes of items at the same time. For example, the number of barrels, half barrels, quarter barrels, etc. (quantities are typed in black for sales and in red for returns), and the amount of charge or credit for beer and, separately, for containers. This machine provides two balances on the ledger account—the total account balance and the container value balance, but the total account balance only is shown on the statement.

On the balance sheet the container balance appears under the Fixed Assets section as Transient Containers. This account always appears separately from the New and Old Containers account which is the inventory of kegs, cases and bottles at the plant.

PROOF JOURNAL - KEG DEPARTMENT

LEDGER

Burton & Matthews,
4703 Sheridan Road.

OLD BALANCES Total	OLD BALANCES Container	Date and Memo	COOPERAGE 2/1	1/1	1/2	1/4	CHARGES Beer	CHARGES Container	CREDITS Beer	CREDITS Container	BALANCE	CONTAINER BALANCE	PROOF New Balances	PROOF Old Balances
0	0												0	0
224.65	300.00												425.00	224.65
784.50	784.50												895.00	785.50
667.00	842.00												750.50	667.00
2345.00	1976.00												3122.50	2345.00
1357.00	992.00	Apr 25 33	30S	20S			650.00	750.00			1400.00	750.00	965.00	1357.00
800.00	460.00	Apr 28 33		10R		20R				200.00	1200.00	550.00	2140.00	800.00
1685.00	1225.00	Apr 29 33	10S		5S		250.50	240.00	800.00		640.00	790.00	4225.00	1685.00
975.00	1290.00	May 1 33	20R							300.00	540.00	490.00	1375.00	975.00
540.00	490.00	May 3 33			40S		210.00	300.00						
		May 3 33		20R						200.00	850.00	690.00	850.00	540.00

STATEMENT

Burton & Matthews,
4703 Sheridan Road,
City.

Date and Memo	COOPERAGE 2/1	1/1	1/2	1/4	CHARGES Beer	CHARGES Container	CREDITS Beer	CREDITS Container	BALANCE (Forwarded) 850.00
May 1 33	20R							300.00	540.00
May 3 33			40S		210.00	300.00			
May 3 33		20R						200.00	850.00

FIGURE II

One of the methods approved by the Commissioner of Internal Revenue for the pricing of bottles in inventory (including both those at the plant and transient bottle inventory) is as follows:

(1) The average price paid for bottles in the year is ascertained and this price is applied as the cost of the equivalent number of gross of bottles on hand as were purchased during the year.

(2) Of the bottles on hand remaining an equivalent number of gross of bottles is priced at the average cost of bottles for the previous year.

(3) Any bottles still remaining unpriced are priced at the average of each previous year until the total value of bottles on hand is arrived at.

(4) To the above is added the increase in equity value of bottles with the trade as shown by the deposit account. That is the difference between the credit balance of the deposit account at January 1 and December 31. If there is a decrease in the balance the reverse holds and the difference is deducted.

Inventory of kegs and cases is arrived at on the same basis except that an allowance of about 15% for depreciation is permitted, based on the difference between that part of the inventory valued in accordance with paragraph one and the total inventory valuation.

Transient Containers Inventory is valued at the same amount as the liability for customers' deposits. Once a year an adjustment, estimated on the basis of past experience, is made in the asset value of Transient Containers Account to cover losses in the hands of customers. Such credits should be balanced with debits to the liability account, Customers' Deposits on Containers, inasmuch as the failure to return such containers will reduce the asset value as well as diminish the liability.

There are many other problems which arise in the distribution and sale of beer. Until conditions become more settled many trucks are being hired. Metal containers are being substituted for wooden barrels and even for bottles in some cases.

Accounting for delivery and for collections is similar in many

respects to that of many other industries and it is hardly necessary to go into detail here.

Much more bottled beer is being sold proportionately than was the case before prohibition. State laws, requiring the sale of keg beer for consumption on the premises and the sale of bottled beer for consumption off the premises in the case of grocery stores and drug stores, have been a deciding factor in making such a division.

The federal government and the state government are making special efforts to keep the industry on as high a level as possible and New York State for one seems to be succeeding fairly well.

The author of this paper is deeply indebted for assistance rendered by Messrs. Bernard M. French, Davies and Davies, public accountants, New York, N. Y., and J. A. W. Hartung, Chief Chemist, Jacob Ruppert Brewery, New York, N. Y.

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OUR OPEN FORUM

THE NATIONAL INDUSTRIAL RECOVERY ACT AND CODES OF FAIR COMPETITION

The far-reaching program of the National Recovery Administration is divided into two parts, both of which must work together in order for the whole idea to be successfully carried through: (a) Industrial Recovery, (b) Public Works and Construction Projects.

It is anticipated that the Public Works Program will eventually employ a million men, it will put them to work on federal, state and municipal projects, and the money these men earn and spend will add to the purchasing power of the whole nation. Again, a demand for materials used in construction will stimulate the activity of the factories supplying materials and profitably employ many other thousands. This stimulation of purchasing power will be only temporary, but it is expected to be long enough to give business the first upward push and to put in motion the wheels of industry and, when all the machinery is in motion, it will be a simple matter for it to be kept moving.

Some features of the National Industrial Recovery Act are not new. Over two hundred and fifty years ago we find that an agreement was entered into between textile manufacturers limiting the weekly production of spindles and that, when this was contested as being a monopoly, the court held that really instead of being a monopoly it acted to distribute the business among different manufacturers thus preventing monopoly.

During the Hoover administration the work on the simplification codes was based on getting the manufacturers to cooperate with each other and eliminate an unnecessary variety of parts, sizes, and models of products. Along similar lines, but on a much broader scale, is the present National Industrial Recovery Act, and it is not hampered by all the provisions of the anti-trust laws.

The distribution of work idea is of course quite simple and has been successfully used by industrial engineers in individual factories, where it was desirable to maintain a certain number of employees on the payroll, even though technological or other changes had resulted in greatly increased production per operator per hour. In a group of factories competing with each other it has never been possible to reduce the working hours and at the same time increase the weekly wage rate, because the increased costs would put any particular factory at a great disadvantage compared with others in the same field. When the Government steps in and says that the minimum wage shall be the same in all these plants and the hours of work shall not exceed a certain maximum, the picture changes entirely and these factories are then on an equal basis.

The National Recovery Administration outlines in Bulletin No. 2 certain provisions which are required in every code, viz.:

"Employees shall have the right to organize and bargain collectively through representatives of their own choosing.

"No employee and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing, or assisting a labor organization of his own choosing.

"That employees shall comply with the maximum hours of labor-minimum rates of pay-maximum machine load of employees and other conditions of employment, approved or prescribed by the President.

"Minimum wage scales should be sufficient to furnish compensation for the hours of work as limited, sufficient in fact to provide a decent standard of living in the locality where the workers reside.

"Trade associations should be prepared to submit evidence to show that the association imposes 'no inequitable restrictions to membership therein and are truly representative.' Also that 'such codes are not designed to promote monopolies or to eliminate or oppress small enterprises.'"

When a code is submitted by an industry a hearing will be arranged for and this hearing will be conducted under General Johnson's supervision or that of one of his deputies. All conflicting interests are represented by advisory boards; there is a board representing Labor, another for Industry, and finally a board to take care of the interests of the Consumer, the hearings are public "all the cards are on the table," and anyone having an interest will be heard.

A point about which there has been considerable misunderstanding is, that these codes do not make inoperative the anti-trust laws. The provisions of a code when agreed upon by the industry and approved by the President become obligatory upon that industry and any acts done in compliance with the code are exempt from anti-trust laws but, in all other respects, these laws are still in force.

It is evident that the Government does not intend to go into the price situation any more than necessary, for as stated by Mr. Dudley Cates, Assistant Administrator, "Nor does the administration contemplate price-fixing as a part of its function. Price agreements proposed by separate industries are subject to approval, if they are not monopolistic in intention or effect or otherwise opposed to the public interest."

It is likely that the Government will be concerned with prices to the extent of seeing that products are not sold below cost and that prices are not set on a profiteering basis. Systems for obtaining comparative costs within each industry will have to be set up and it is evident that accountants are going to be quite busy on this problem alone for the next couple of years.

In regard to seeing that the agreements and regulations in the code are carried out, the thought arises that there would be required a considerable police force, constantly checking up on this. But I was advised by one of General Johnson's right hand men that this is not the case. Also General Johnson himself stated, "I had an opportunity of watching the same sort of thing during the draft. Everybody told me you can't make draft boards go without force. We intended to make it police itself, because in a particular community people who were not playing the game would be taken care of by other people of the community. We want to avoid inquisitorial powers and police functions. Whoever begins to violate codes will be complained against by the people in the industry itself." (Quotation from National Recovery Administration, Release No. 9.)

General Johnson has set up a publicity department in the Department of Commerce building, Washington, which issues daily Bulletins on the Industrial Rcovery Act and where up-to-date information on progress can quickly be obtained. If one has certain definite Government officials to see, a trip to Washington may be worth while, otherwise it is not advisable, for all information as to codes, decisions and pertinent points decided at hearings is promptly published in the newspapers.

Undoubtedly this is a gigantic and magnificent experiment, done on a huge scale and the thought expressed by some officials in the Government is "If this plan doesn't pull us out of this depression nothing else will."

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